

THE Malayan Agricultural Journal.

SEPTEMBER, 1931.

EDITORIAL.

The Malayan Pineapple Canning Industry.

In appointing a Conference to enquire into matters affecting the Malayan pineapple industry and to suggest methods of improvement with special reference to the English market, His Excellency The Governor created an opportunity for a thorough review of the present methods of cultivating the crop and canning the fruit and of comparing and placing on record the points of view held by the three branches of the industry in Malaya, *viz.* growers, packers and exporters. In addition, the Malayan Information Agency and the Empire Marketing Board were able to assist the Conference by information on the method of trading canned pineapples with particular reference to the United Kingdom.

The official members of the Conference consisted of the Director of Agriculture as Chairman with three other officers of his Department, H.M. Trade Commissioner for Malaya, the Commissioner of Lands, Straits Settlements and the Commissioner of Lands and Mines, Johore. Owing to duties in other directions the last-named officer was unable to attend the Conference meetings and therefore did not sign the Report.

Owing to the delicacy of the position, the official members agreed that it would be inexpedient to nominate representatives of the growers and canners interested to attend all sessions of the Conference and it was decided to invite a number of gentlemen connected with the industry to appear in turn before the official members of the Conference and to discuss with them the position. The Conference is grateful to the 13 gentlemen who accepted the invitation to meet the Conference to state their views. They consisted of 4 representatives of the Johore and Singapore small growers, 5 representatives of the canners and/or exporters, three Health Officers and the Registrar of Imports and Exports.

Four meetings of the Conference were held in Singapore. The Report and Proceedings of the Conference were submitted to the local Governments in April 1931 and the Report published at the end of August.

It is to be noted that the Commissioner of Lands and Mines, Johore, did not sign the Report as he was unable to attend the meetings. The Commissioner of Lands, S.S. proceeded on leave before the draft report reached its final form. The divergence of his views from those of the remainder of the members was

stated in a memorandum a resumé of which is appended to the Report together with the reply drawn up by the other members.

We attach very great importance to the Malayan pineapple industry and therefore any authoritative report on the subject is worthy of the widest publicity. It is for this reason that we have replaced articles which had already gone to press for this number of the *Malayan Agricultural Journal* by an abridged report of the Conference. This account is practically a full version of the Report, only paragraphs dealing with the constitution and method of work of the Conference and certain statistics having been omitted.

The fact that the Government considered it advisable to appoint a Conference on this subject proves that the value of the industry of pineapple packing is one of considerable importance to the country and it is surely not an unfair inference to suppose that His Excellency was doubtful as to whether the industry was at present established on a satisfactory foundation.

The Report early indicates that the Malayan pineapple industry has no great amount of stability and proceeds to point to its weaknesses, to shew how they have arisen and to make recommendations towards the establishment of the industry on a firm basis.

It would be out of place for the present writer, who was a member of the Conference, to review critically the report for which he takes part responsibility. The reader is therefore invited to read the report and form his own conclusions from the information given and from his own knowledge of the conditions obtaining in this industry.

The following summary is appended to the report and forms a useful index to its recommendations:—

“The principal recommendations of the Conference are as follows:—

- (1) “That owing to the natural suitability of Malaya for the cultivation of pineapples the industry represents an asset of considerable value, and as such should be a matter of concern to Government. In other parts of the world efforts are being made to develop and extend the pineapple industry, while the conditions at present occurring in Hawaii, owing to the incidence of pineapple wilt disease, afford an opportunity for the extension and stabilisation of pineapple cultivation on a large scale in Malaya, which should not be neglected.
- (2) “That, as it has been conducted in the past, the industry lacked stability owing to the fact that it has been largely, if not entirely, carried on as a catch crop between young rubber and treated as a means to an end rather than as an end in itself. This should not, however, be allowed to obscure the possibilities which the industry offers for stabilisation and expansion.
- (3) “That the present depressed position of the industry is largely due to the lack of financial resources among growers and the methods of marketing which have sprung up in consequence, which have led to

destructive competition. Efforts to improve the industry must therefore tend to impart greater stability and confidence if they are to be successful.

- (4) "That the demand for Malayan canned pineapples in the United Kingdom is steadily increasing, largely as the result of the work of the Malayan Information Agency in connection with shows and exhibitions; that the present state of the market bears no relationship to stocks and to demand. That a continuation of this policy must tend to increase the demand and is advocated.
- (5) "That the most important and fruitful line of expansion probably lies in the development of large scale plantations with sufficient financial resources behind them, and that such enterprises should be encouraged.
- (6) "That further investigations concerning the agricultural requirements of the crop are badly needed and should be carried out.
- (7) "That to improve the position of the industry any steps likely to lessen the speculative element and to inspire confidence are likely to prove advantageous.
- (8) "That one of the present chief sources of weakness lies in the fact that no means exist at present for enabling consignments to be traced back to individual factories; in consequence legislation is recommended requiring that each case and tin before it leaves the factory should be stamped with an identifying mark which while it should be registered by Government and should be known to shippers and wholesale buyers, would be of such a nature as to disclose nothing to the retailer and consumer.
- (9) "That in view of the present irregularity in the pack and the lack of confidence which this entails, the introduction of systematic government grading and inspection of produce before it leaves the factory is desirable, the cost of which would be met by a small export cess on canned pineapple. It is recommended that such a grading service should be optional during the initial stages.
- (10) "In order that the advantages which Malaya offers for the cultivation of Malayan pineapples may become more easily appreciated, it is recommended that the Malayan Governments should examine the possibilities of fostering and assisting development by alienating land suitable for pineapple cultivation on favourable terms provided that adequate guarantees are forthcoming both as to cultivation and manufacture.
- (11) "It is also considered that the possibility should be explored by the Government of rendering financial assistance to undertakings that are desirous of establishing pineapple cultivation and canning on a sound basis following the example of certain other countries in this direction."

Amongst the main recommendations of the Conference is that of Government inspection and grading. This is no new idea. It is an established practice in almost all fruit canning countries and has been extended to all the important food products—meat, fruit and vegetable. It has as its main object the creation of confidence in the particular product amongst consumers and should therefore result in the establishment of a regular demand at stable prices.

Hitherto, the success of Malayan canned pineapple products has been based on their cheapness in competition with similar products from other sources and other canned fruits. This cheapness has been made possible chiefly by the fact that pineapple cultivation in Malaya has been treated as a catch crop with young rubber. This state of affairs cannot continue indefinitely and with the present slowing up of rubber planting, we are already in sight of a curtailment of supplies of fruit. The sacrifice of this Malayan industry, the exports of which are valued at approximately £1,000,000 per annum must be prevented and this can only be achieved by a re-organisation of the industry.

The Malayan Information Agency and the Empire Marketing Board have done much in the past two or three years to popularise Malayan pineapples in the United Kingdom and there are possibilities of developments on the Continent of Europe, given a continuation of supplies and a stabilisation of quality.

An article written by the Empire Marketing Board on the Canned Pineapple Trade was published in the July, 1931, number of *The Malayan Agricultural Journal*. It is there shown that 84.4 per cent. of the imports of pineapple into the United Kingdom come from Malaya, while 28.2 per cent. of the total import of all fruits canned in syrup are pineapples.

This is satisfactory reading and if we could be sure of holding the position we have gained there would perhaps be but a weak case for the re-organisation of the industry in Malaya. But competition is becoming stronger, not only from the Colonies and America, but in particular from the recently established and rapidly expanding canning industry in the United Kingdom.

A good impression of the canning industry in the United Kingdom may be gathered from the special Canning Supplement published with the *Manchester Guardian Commercial* on May 14, 1931. It is there stated that the 1930 pack of fruits exceeded 30,000,000 cans which was nearly double that of 1929 while reasons are given for supposing that production has by no means reached its maximum. The industry really began to get into its stride only five years ago, and as little as two years ago there were only five firms engaged in it; to-day nearly forty well established firms are in the field, while the capital invested is stated to exceed £3,000,000.

Admittedly, the English canners do not deal with pineapples, but the wider choice of canned fruits offered to the public must necessarily have its repercussion on the Malayan trade in canned pineapples.

In addition to competition from our old trade rivals, and from the newly established industry in the United Kingdom, competition in canned pineapples

may also be expected from the Far East, for the Formosa industry in canned pineapples shows every sign of rapid development.

It therefore behoves Malaya to design a policy that shall ensure the continued growth and prosperity of the Malayan canned pineapple trade. An Editorial in the *Manchester Commercial* referred to above states—

“.....Canning is a highly specialised business, and while money may be found, and up-to-date plant bought, that alone is not going to make for success; qualified men are indispensable..... The Cannery's responsibility to the public is so great that very little careless work might well jeopardise the reputation they have built up. Briefly, then, it is to be hoped that development will extend on the safest possible lines—through existing canning firms who have the knowledge and experience essential in turning out products, reliable in every way.”

These remarks may well apply to the Malayan canning industry. We may commence the re-organisation of our industry with the very great advantage of a market already established and with our factories that are now constantly being improved. The problems before us are therefore :—

- (a) to ensure future supplies of fruit;
- (b) to ensure the quality of the canned fruit;
- (c) to organise the marketing to the best advantage of the industry as a whole.

Throughout the trade, from grower to the London market, is a chain of men with experience that has been built up during the past 25 years. It is to be hoped that they may throw the weight of their knowledge and experience into the pool for the establishment of the industry on the soundest economic basis.

THE PINEAPPLE CANNING INDUSTRY IN MALAYA*

General.

The Malayan pineapple canning industry took its rise somewhere about 1904. Up to the present it has been maintained practically exclusively as a means of handling pineapples grown as a catch crop between young rubber, and has been carried on almost entirely by Chinese. It will thus be seen that the origin of the pineapple industry is contemporaneous with that of the rubber industry and in its present form it may be described as a by-product of the rubber industry.

The industry began in Singapore and was until about 1921 practically entirely confined to that island, the produce being known as Singapore pineapples. The very considerable extensions of rubber planting which took place in South Johore about that time, however, brought about a corresponding increase in the planting of pineapple as a catch crop in that State; this was the outcome of the fact that much of the development in Johore was effected by Chinese planting interests in Singapore which naturally tended to make use of methods similar to those which had been already employed successfully in Singapore in a similar connection. Up to the present, the only other area in Malaya in which pineapple growing has become established is in Selangor; elsewhere in Malaya the crop is not at present grown for export.

It is obvious that under these conditions the industry has no great amount of stability, while the set back which the rubber industry has lately suffered owing to the slump seems in due course bound to have its repercussion on the pineapple industry; the situation is accentuated by the fact that the Malayan Governments have decided that until further notice no lands should be alienated for rubber planting. In existing circumstances it would seem that during the next few years the area under catch crop pineapples will in all probability decrease considerably, inasmuch as the planting of new areas under rubber is in the circumstances bound to decrease also. It is true that in Johore considerable areas still exist which have been alienated for rubber but not yet planted and that on these pineapple cultivation may be undertaken for some time to come, but on the whole, it seems probable that the general tendency will be towards the decrease in the area planted in pineapple as a catch crop, inasmuch as when the rubber matures the pineapple crop must be removed and unless the new restriction on fresh alienation of land for rubber cultivation is rescinded, there seems little possibility of continuing the existing system on the present scale for any lengthy period.

The prospects of the industry are still further adversely affected by the prices at present ruling for canned pineapples, which are lower than any recorded

* The following is an abridged Report of the Pineapple Conference held in Singapore on December 18, 19 and 20, 1930 and March 9th, 1931.

since 1915. While the price for rubber continued to be high, and large new areas were being opened up for rubber planting, the cultivation of pineapples as a catch crop could be undertaken profitably inasmuch as the return, even at very low prices for pineapples, constituted a distinct saving in respect of weeding and cultivation charges which would in any event have to be faced, while not infrequently rubber plantations established in this way changed hands at very profitable figures once they came into tapping. Now, however, the only possibility for the indefinite continuation of the industry would appear to lie either in its development as a main crop or as a catch crop between some other form of permanent plantation. It is impossible to say in the present disturbed state of the world's markets what the prospects in this latter direction are: they may be appreciable, but in any event on purely a catch crop basis it seems unlikely that the industry can ever have any real permanent stability.

At present prices there would not seem to be great possibilities of establishing the industry on a permanently paying basis as a main crop: nevertheless the industry is a valuable one: the total exports of Malayan canned pineapples during the year 1929 amounted to 58,692 tons valued at \$9,233,732, while those for 1930 were 57,959 tons valued at \$7,859,026. A definite market and demand exists for the product in the United Kingdom and it is certain that whatever else may happen, that demand will continue if the price to the consumer is not materially increased. This demand will keep pace with the strongly increasing demand for canned fruit of all descriptions. It is obvious, especially at the present juncture, that an industry with an established and certain demand for its products in the United Kingdom is an asset of great potential value. In consequence, a critical examination of the position having for its object the ascertaining of the cause of the weaknesses of the industry together with possible remedies is of importance.

Quantity & Value of Exports of Malayan Pineapples.

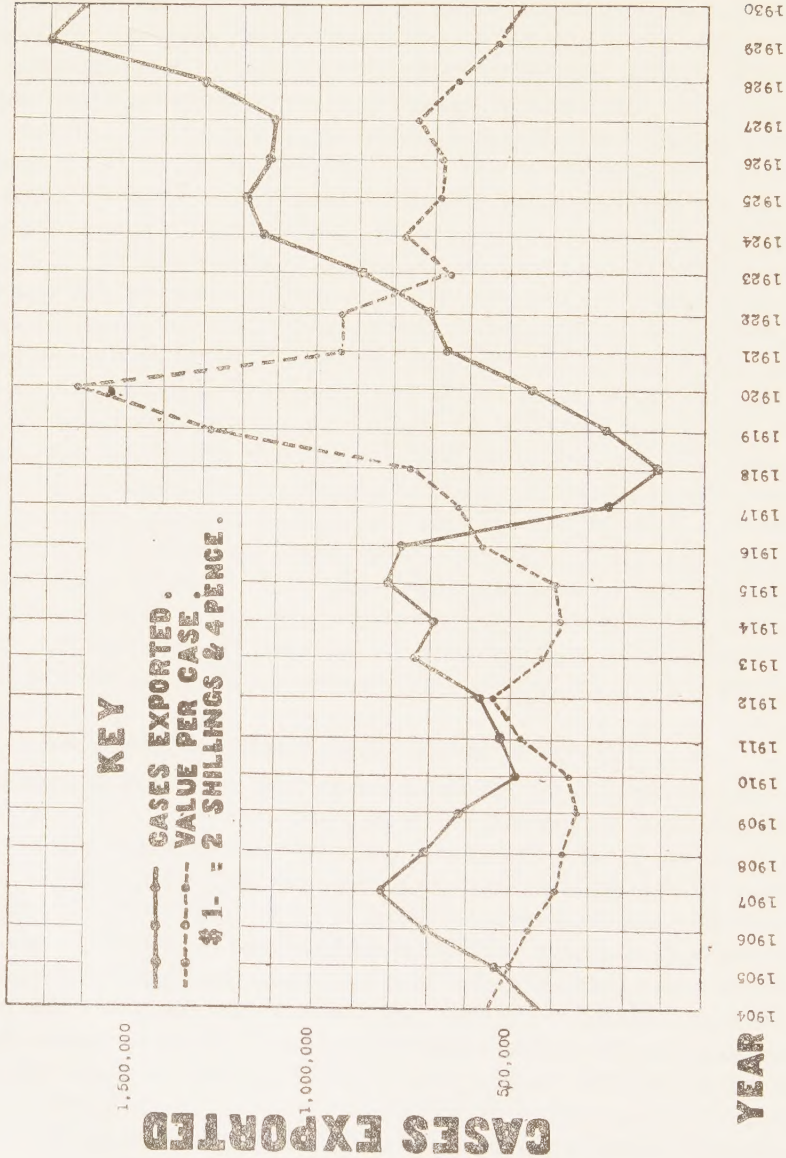
The accompanying graph shews the quantity and values of exports of canned pineapples from Malaya from 1904 to 1930.

It will be seen that between the years 1904 and 1921 the annual export ranged between 100,000 and 850,000 cases, with corresponding wide fluctuations in price; in 1919 the price underwent a sudden rise, probably due to the post-war boom and shortage of supply which had occurred as the result of war conditions. Thereafter the production has steadily augmented, while prices have steadily declined. Compared with other years the average price for the year 1930 is lower than for any corresponding period since 1915, while during the month of September, 1930, the market price of \$3.30 per case is almost the lowest ever record.

If these figures are taken at their face value it would appear that they present an example of the operation of the ordinary law of supply and demand, that if the natural course of events is allowed to operate the present low market value is bound to result in a shortage of supplies which will in due course bring in its

ANNUAL EXPORTS & VALUES OF CANNED PINEAPPLES FROM MALAYA.

EXPORT VALUES PER CASE (DOLLARS)



train a rise in price. To an extent this is undoubtedly true; on the other hand, there is also no doubt that there are a number of other factors operating which tend to make the position worse than it should be.

This is more clearly seen when it is stated that at the present time stocks of canned pineapples are lower than they have been for many years both in Singapore and London; that the demand is steadily increasing; that the reputation which the fruit enjoys in the English market has considerably improved of recent years; and that on evidence presented to us from a number of sources, there is definitely no over-production at present.

The Position of Malayan Canned Pineapples in the World's Market.

The world's production of canned pineapples at the present time is principally divided between two countries, *vis.* Hawaii and British Malaya: there is also a small export from South Africa and Australia, while in Formosa there is also a steadily increasing production, which at the present time is actually consumed in Japan and China.

The average annual exports from Hawaii would appear to be about 425,000,000 lbs. valued at about \$40,000,000 gold. The Malayan trade comes second in importance. Hitherto, Hawaiian canned pines have hardly entered into competition with the Malayan product, as the aim of the Hawaiian producer has always been to produce an article of first class quality selling at a relatively high price. Malayan pineapples have, on the other hand, always ranked as a comparatively inexpensive article and have come to occupy the place of the cheapest canned fruit on the market.

During the past two years efforts have, however, been made to improve the quality of Malayan pineapples, and as a result the opinion has been expressed that the best brands of Malayan fruit can now compete on level terms with the product of Hawaii. This, however, only applies to a small fraction of the pack; in general the quality still falls decidedly below the highest standard. The principal defects at present encountered appear to be:—

- (a) Irregularity of cutting and slicing;
- (b) Lack of uniformity in the number of slices or cubes packed per unit tin;
- (c) Lack of care in the preparation of the syrup.

The Malayan product at the present time has by far the largest share of the English market. It is estimated that 86 per cent. of the canned pineapples consumed in the United Kingdom are the produce of the British Empire, and of this Malaya's share represents 80 per cent. of the total. The latest available figures shew that for 1929 Malayan pineapples constituted 84 per cent. of the total exports from all countries into the United Kingdom.

The reputation and popularity of Malayan pineapples in Great Britain has been considerably enhanced during the past two years by the systematic advertising campaign which has been carried out by the Malayan Information Agency

acting in collaboration with the Empire Marketing Board. There is also reason to believe that a large untapped market may exist for the produce on the Continent of Europe.

Another important factor which influences the position at the present time is the prevalence of a disease amongst pineapple plantations in Hawaii, known as pineapple wilt. This disease is reported to have severely affected the output of many of the Hawaiian plantations, while so far no satisfactory remedy has been found for it, so much so that certain of the Hawaiian companies are reported to be opening up plantations in the Philippines, while one of the most important, namely Messrs Libby & Co. have recently acquired a large block of land in Kenya for the purpose of embarking on pineapple cultivation on a large scale in that Colony.

Soils and conditions suitable for Pineapple Cultivation.

Pineapples grow best on fairly open sandy soils as the plants require free drainage; for this reason also gently sloping lands are to be preferred. These conditions are met with on the majority of the inland areas, wherever topography lends itself to free natural drainage. In particular the quartzite soils, and the granite soils are known to produce the crop very satisfactorily. Considerable areas of this type of soil exist. Pineapples can also be grown on other soil types and also, in particular, are frequently grown in Malaya on peat soils, although under the latter conditions the fruit is not of such good quality, nor does it ripen so readily.

Equatorial conditions such as are encountered in Malaya are particularly favourable for the crop, inasmuch as thereunder the fruit is harvested in two crops of about 3 months duration each, *viz.* in May, June and July, and October, November and December respectively, of which the May—July crop is somewhat heavier and of slightly longer duration than the October—December crop, instead of in one big crop and one small crop as occurs in Latitudes further north and south of the equator. Conditions such as these make possible the employment of smaller factory units, and make for economy in labour inasmuch as they enable a smaller labour force to be employed for a longer period and tend to minimise the necessity for having a large labour force to deal with a harvest covering a short period of time.

The marked suitability of Malaya for Pineapple Cultivation.

From what has been said it is clear that Malaya is peculiarly favourably situated for the cultivation of pineapples; added to its considerable natural advantages it possesses an established market for the produce, combined with a steadily increasing demand. Against this must be set the fact that at present the industry is in considerable difficulties and is certainly not remunerative to

growers. Until recently the industry has always been regarded locally as a mere incident in the development of the rubber industry, and as such of little real or permanent importance. No attempts have been made to improve cultural methods or to assist the growers. The inception and development of the industry is entirely the outcome of the initiative and enterprise of members of the Chinese community and to them credit is exclusively due for having endowed Malaya with an industry of considerable importance, the produce of which is valued at upwards of £1,000,000 annually, coming fifth in this respect in the exports of Malaya. The fact should not, however, be overlooked that other countries are becoming alive to the opportunities presented by this form of cultivation. Mention has already been made of developments likely to take place in Kenya, and of the growing trade in Formosa, in Mauritius also the Government has recently heavily subsidised an experimental factory with the object of endeavouring to develop a pineapple industry.

Areas under cultivation in Pineapples in Malaya.

The Malayan pineapple industry is confined to three administrative areas, namely, Singapore, Johore and Selangor. The approximate total areas under the crop are estimated as follows:—Johore 40,000 acres, Singapore 8,000 acres, Selangor 4,000 acres. As stated, practically the entire area is interplanted as a catch crop between young rubber and although various proposals have been put forward for planting pineapple as a main crop, none of these so far have materialised. In Singapore land has been given out for cultivation in small areas of 2 to 5 acres each but in practice they have tended to become combined into blocks of approximately 200 acres each under the control of one individual and worked by the lessor by contract and day labour. In Johore areas have been given out in large blocks and are subdivided by the owners and worked either on contract or on the "squatter" basis. There is, however, an area of approximately 10,000 acres in Senai District, Johore, which is entirely worked by small-holders. In Selangor there is only one large area worked by a Chinese planter; the remaining areas under cultivation in that State consist of small holdings.

Methods and Cost of cultivating Pineapples in Malaya.

Figures for the cost of cultivating pineapples are to some extent conjectural. From information gathered by the Department of Agriculture the following is an estimate of the probable cost per acre of cultivating the crop:—Rent, say \$3/-, Clearing the land \$30—\$40, Purchase of suckers \$3—\$5, Planting suckers \$3, Weeding and cultivation 1st year about \$24. The subsequent upkeep would amount to about \$2—\$5 per mensem.

As the crop is at present grown entirely as a catch crop on virgin lands or reclaimed secondary jungle, the question of manuring does not come in to the

calculation, but if the crop is to be grown as a main crop, manuring must in due course become essential. No information is at present available concerning the manurial requirements of the crop in Malaya.

The variety of pine principally cultivated is that locally known as the Queen pine. A number of other varieties are also cultivated on a small scale, but are not locally considered as suitable for canning. The Queen pines give a fruit which when ripe possesses flesh of a golden yellow colour and excellent flavour. The smooth Cayenne pine which is the standard variety grown in Hawaii is not, so far as is known, grown at present. Planting is usually performed at a distance of 5 feet by $2\frac{1}{2}$ feet, with a six foot path at about every 100 feet. This spacing gives from 3,000 to 3,400 plants per acre. No information is available regarding optimum planting distances. Cultivation consists in weeding between the rows and in mounding up the pines.

The Department of Agriculture is now undertaking the organisation of a Pineapple Experiment Station in Singapore which will be devoted to obtaining information on all these points; an experimental programme has been laid down which is being duplicated at the Experimental Plantation, Serdang. We think that information on these points is of vital importance if the industry is to be stabilised on the basis of cultivation as a main crop and we would here emphasise that the cultivation of pineapples as a sole crop constitutes the most promising development for the permanent existence of the industry. Though the industry has now been carried on successfully for about 26 years with pineapples as a catch crop, it seems improbable, though not impossible, that opportunities for cultivation on these lines will continue to occur.

The first crop is generally harvested 18 months after planting, from 1,200 to 1,500 fruits per acre being obtained. Thereafter, for a further $3\frac{1}{2}$ years to 4 years, two main crops are reaped annually, namely in May, June and July, and in October, November and December, although small amounts of fruits are coming in all the year round. After the crop is in full bearing, the first four crops give 4,000 to 5,000 fairly large fruits per acre per annum followed by three or more crops smaller in number and poorer in quality. One witness stated that cropping could be maintained up to ten years, but it is considered doubtful whether this is an economic procedure.

Disposal of the Fruit by Growers.

The fruit is either sold by the growers to the canneries at the factory doors or on the road-side, and is also purchased by passing lorries at road-side for re-sale to the factories. Prices vary according to the market value for canned produce and also according to the supply and the quality of the fruit. At present the average price in Johore ranges from 70 to 85 cents per hundred fruit delivered at the factory, although for first class fruit, prices have ranged as high as \$1.50.

When the market is low it is apparently the practice to endeavour to pass on to the grower the whole of any fall in price which takes place, though it is not clear that the grower obtains the full advantage of any rise that may occur.

In Singapore prices rule slightly higher than in Johore. This is apparently due to the fact that an export duty on both fresh and canned fruit is levied by the Johore Government *viz.* 12½ cents per 100 on fresh and 4 cents per case on canned fruit and also to the cost of transporting fruit from Johore to Singapore. A certain proportion of the Johore crop goes to the Singapore canneries, which are unable to operate full time on the produce of Singapore Island alone.

At existing prices *viz.* 80 cents per 100, the return apparently does little more than pay for the cost of collection and transport and yields practically no profit. Various witnesses informed us that it was considered that a fair price for pines would be about \$2 per hundred and that at this figure a reasonable margin of profit to the grower would be assured. To enable such price to be paid we were informed that a minimum of \$4.50 per case f.o.b. Singapore would be required. It is to be observed that this price is considerably below the values which have ruled for a number of years past with the exception of 1930.

No system of advances to assist small growers exists; frequently growers are not paid for their produce on delivery and have to wait for payment until the factory has realised an advance on a delivery for shipment. A small growers' Co-operative society, if and when possible, might provide a remedy. At present it does not appear to be feasible.

Conditions in Relation to Manufacture.

There are at present 18 canning factories in Malaya. Of these 5 are situated in Singapore, 12 in Johore and 1 in Selangor. They are for the most part primitive and consist of temporary buildings constructed of wood and galvanised iron. It is stated that some of these were not built as pineapple factories but as godowns. This form of construction was adopted owing to the conditions under which the industry existed; the cultivation being in the shape of a catch crop between young rubber was fugitive, and was bound to be displaced as soon as the rubber approached maturity. Consequently, the type of factory evolved was such as required comparatively little capital for its erection and at the same time could readily be dismantled and re-erected elsewhere as soon as the area which it was originally intended to serve had become converted into mature rubber plantations.

For the same reason there has been little or no expenditure on expensive or heavy machinery; the whole of the operations of peeling, coring and slicing the fruit as well as the syruling and sterilising of the cans being performed by hand. In Hawaii all of these operations are performed by highly ingenious machinery, but none of these machines have so far been imported into Malaya. The only machinery which forms part of the equipment of the ordinary Malayan pineapple factory is that required for the making of cans. All factories at

present working in Johore have now introduced tile-topped tables, but in some of these factories the water supply is still defective. In particular one factory has erected a modern building, installed a satisfactory water supply and more modern plant for can making. In Singapore all factories are situated within the Municipal limits and as such are subject to Municipal regulations and in consequence have the advantage of a pure water supply from the Municipal areas. All factories in Singapore employ white tiled trimming tables.

Lately, the Health Authorities in Johore have become active in this connection and have insisted on the maintenance of a better standard in relation to pineapple factories than formerly existed. Their activities have been regulated by the new Food and Drugs Enactment of Johore. It is to be remarked that the improvement in conditions thereby effected is an asset and that the attainment of a satisfactory standard of hygiene in these factories is of considerable importance. The Health Officer at Johore, Dr. Gross, who gave evidence before the conference, stated that he proposes to undertake a series of tests of the bacteriological purity of the products from different factories. It may be remarked that the Canadian Government has recently taken an interest in this question and the Canadian Trade Commissioner visited all the pineapple factories in Johore and Singapore for the purpose of preparing a list of products which would be admitted to Canada by reason of the fact that the factories in which they were produced had obtained a satisfactory standard of hygienic production.

Of the 18 factories one owner controls four. It is stated that this represents about 40 per cent. of the total output. A London firm now controls the output of two of the largest factories in Johore; this represents a further 30 per cent. so that 70 per cent. of the total output may now be said to rest in the hands of two producers. At the time of writing, of the remaining 12 factories, 5 are not operating owing to the fact that the proprietors have become financially embarrassed as a result of the general slump conditions at present prevailing which have affected their financial interests in other directions.

Forms of Packing Adopted.

The fruit is generally packed in tins each containing $1\frac{1}{2}$ lbs. of fruit. The $1\frac{1}{2}$ lbs. tins are packed in standard cases containing 48 tins. The fruit is packed in slices or cubes or whole pines; three grades are recognised *viz.* "Golden Yellow", "Good Average Quality", and lower grades. The "Golden Yellow" and "Good Average Quality" (G.A.Q.) grades are shipped to England and the lower grade to China. The percentage of "Golden Yellow" quality to "Good Average Quality" has been variously stated to range from 10 to 40 per cent. of the pack of individual factories, it is estimated to contribute 10—15 per cent. of the total output of Malaya. It is considered that with more intelligent cultivation and greater attention to the selection of fruit for canning, the percentage could be raised to 60 per cent. of the entire crop. A small amount of produce is shipped in the shape of pulp; at the present

time the market for this article is better than for either cubes or slices. Up to the present it has not been possible to extend its production greatly, on account of the fact that a larger size of tin containers is required which cannot be conveniently made by the existing can making machinery, while sterilisation of the product presents special difficulties with the existing sterilising plants. We understand that one firm is considering the introduction of special machinery for producing grated pineapple. The pines are packed in syrup of 11 per cent. strength, the cane sugar for making which is imported from Java.

Until recently complaints were very numerous concerning the quality of the packing, especially in relation to the grading of the fruit, it being quite usual to find that fruit shipped as "Golden Yellow" contained an appreciable quantity of slices or cubes of a lower grade. The differentiation is practically entirely on colour: the "Golden Yellow" quality consists of fully ripe fruit, "G.A.Q." and lower grades being obtained from less ripe fruit.

By-Products of the Industry.

The present methods of pineapple canning necessitate the rejection of about one-third of the fruit received in the factory, in the form of peelings, cores and bad fruit. The disposal of this waste has frequently been a source of considerable embarrassment to canners who have had the alternative of accumulating a considerable heap of this waste in close proximity to the factory or of incurring expense in its disposal at a distance from the factory.

The utilisation of this waste has been a subject of investigation by the Department of Agriculture, S.S. and F.M.S., and by the Hawaiian canners. It has been shewn* that for economic disposal of the waste matter, removal of the juice by expression is essential. The fermentation and distillation of the fresh juice for the production of potable alcoholic liquor similar to brandy or "samsu" is a simple process.

More recently, Hawaiian canners have commercialised the preparation of "Pineapple Bran" from the solid portion of the waste, and the export of pineapple juice obtained from the fresh peelings and cores. The former is employed for cattle feeding, while the latter finds a ready market in America and a developing market in the United Kingdom. The general adoption of similar methods of disposing of the pineapple waste from the Malayan factories is obviously desirable both on hygienic and economic grounds.

Economic and Financial Position of the Canneries.

The industry is characterised by the fact that it has always suffered from insufficient capitalisation. The small expense that has hitherto been involved

* By—Products of the Pineapple Canning Industry by V. R. Greenstreet and Gunn Lay Teik. *Malayan Agricultural Journal*, Vol. XVI, No. 1, 1928.

in starting a factory, the transient nature of the cultivation, and the fact that the industry has in the past been largely regarded as a means to the end of inauguration of rubber plantations which were intended to be sold as soon as they reached maturity, has tended to attract thereto people of little or no financial stability but with a strongly developed speculative bent; as a result the whole industry is under-financed and is distinctly in the nature of a gamble. The present method of financing can only be described as hand to mouth; packers frequently depend on obtaining advances from merchants on deliveries of packed pinapples as they are effected to enable them to meet their obligations to growers for deliveries of fruit and to pay for the operation of the factory. No system of financing canneries by shippers or by merchants at Home is generally practised, although certain firms give credit to factories for purchases of tin plate and other supplies, and also handle the produce of the factories, the two transactions to an extent mutually offsetting one another although they are treated as being separate and independent.

The only exception to this consists in the two factories in Johore which are being operated by an English firm. It seems possible that this may prove the first step towards the greater stabilisation of the industry, but it is as yet too early to pronounce an opinion on this point.

Marketing Methods current in relation to the Industry.

The speculative character of the industry is reflected and continued in the marketing methods employed. As stated above, the produce is delivered by the factories to various firms of merchants in Singapore who in turn dispose of the product to distributors.

Practically all the exporters are branch offices of London general merchant houses and the majority of these firms receive orders from England only through their own offices there. The Singapore Branch of one firm is an exception as it ships to its Export Department in London, which in turn sells to its own Canned Provisions Department. Another exception is the London firm which has assumed control of two Johore factories and which market their own products in the United Kingdom and Canada and sells to export firms in Singapore.

Fully reliable information as to the London position is not obtainable in Singapore, but many London firms sell most if not all of their imports to brokers, and it is probable that the majority of the trade passes through their hands. One firm has an organisation of travellers and sells part of its stock direct to wholesale or retail grocers, but a part is also sold through brokers. The brokers sell to, or rather buy on behalf of, wholesale and retail grocers.

The major part of the crop is disposed of in England, but of recent years there has been also a steadily increasing export to Canada and New Zealand while there is also a certain amount of trade with China.

For the most part the tins as they leave the factory have no distinguishing mark. A certain canner informed us that some time ago he had installed an

embossing plant in his factories for the purpose of stamping the name of his firm on the tin lids, but that he was unable to find a market for produce stamped in this way in the United Kingdom and at present the only market for it is in China. Another firm has recently adopted an embossed design for the tops of tins produced from the two factories controlled by them. It is understood that the firm adopted this course for their own protection, but that they met opposition to the course from their clients in the United Kingdom. We have recently been informed by the Malayan Information Agency, who at our request have instituted enquiry in London as to the reception in London that was likely to be given to a proposal for embossing tins with the name of the canner, that it was undesirable to stamp tins with the name of Chinese factories. We are also informed that one exporting firm has received instructions from their London office to accept no tins whatever that are embossed.

Malayan pineapples are thus largely a more or less standard trade article and the wholesale and retail buyers in the United Kingdom have no means of identifying the factories from which the produce which they handle emanates, the only link being the Singapore mercantile firms which handle the produce at this end.

The produce is sold under the label of the English wholesale distributor, which usually contains no reference to the factory where the products are made. Labels are affixed either before shipment in Singapore or after arrival in the country of distribution. The tendency has been of recent years for the proportion of tins labelled prior to shipment steadily to increase, and at present it is stated that 70—75 per cent. of the exports are labelled in Malaya. The reason underlying this would appear to be mainly that labelling can be carried out more cheaply in Malaya than in the country of destination. Formerly labels when affixed in Malaya were supplied entirely from abroad, but recently some have been printed in Singapore.

In some cases the name of the exporting firm is printed on the labels. For instance, one firm of exporters receives labels printed with the name of their London house or that of a wholesale grocer, while another firm receives them printed with the name of their London house or without a name. Probably each label without a name is reserved for some large grocer of the chain store type. It may be mentioned here to shew the complicated character which the industry has assumed that while at the present time there are only 13 factories operating in Malaya and 70 per cent. of the crop is handled by two canneries, Malayan pineapples are sold under at least 70 different trade labels.

The state of affairs has led to a vast amount of speculation, and Malayan pineapples have been not inaptly described as a speculative counter in the market. Speculative forward buying is largely practised, while the lack of financial resources on the part of many of the canners and the consequent inability to hold stocks has further favoured destructive competitive buying and selling. In this connection may be quoted the following remarks from a memorandum supplied by the Malayan Information Agency—

"The destructive competition in the English Market.....is undoubtedly a serious contributory factor making for low prices which arises from:

- (1) Canneries offering through more than one source here thus creating competition in selling;
- (2) English export houses in Singapore selling pines short through their London Offices;

In regard to (1) and (2) canners have the remedy in their own hands, as to (2) while the existence of this factor and of the important part it plays is known, it is not an easy matter to convince canners that it is not ultimately to their interests to encourage trade with English Singapore Exporting Houses who are known to speculate in Singapore pines. For example:— On May 1st canners price is, say 3/3 for $1\frac{1}{2}$ cubes May—June shipment. On the same date an English Exporting House will be offering firm May—June shipment at 3/1 $\frac{1}{2}$ —he takes the business—the canners then drop to 3/1 $\frac{1}{2}$, but provided there is no firmer tendency in the market and with the English exporting house still offering freely at 3/-, this goes on and the English exporting house chooses the right moment for buying in their requirements in Singapore. Assuming the market has dropped to 3/-, buyers here have had their requirements filled or have withdrawn in anticipation of still lower prices and the exporting house, being the only buyer in Singapore, appears to the canner as a very useful ally. It is difficult to persuade the canner that had it not been for the activities of the particular exporting house the price would never have dropped from 3/3d. When it is obvious that certain houses are selling short and London representatives suggest buying for joint account the canners suggest that their London representatives buy for their own account. When this is done the canners almost immediately drop their prices, involving the London representative at a loss. It appears obvious that if it is not good enough for canners to support their own market it is not good enough for the London representative to undertake it. There is reason to believe that certain firms have frequently sold short during the past nine months."

We desire to add that all local interests whom we have consulted agree that the above is a fair and accurate statement of the position. We also desire again to point out that the present low prices are not the result of over-production, inasmuch as stocks at the present time are lower than they have been for many years. We have been assured also that the London market would probably have no objection to paying somewhat higher prices, but in view of the fact that pineapples are offering at very low rates, wholesalers naturally see no point in paying prices higher than those which are asked. In consequence, the conclusion is arrived at that while the present position is no doubt in part to be attributed to the present world wide depressed trade conditions, the greater part of it is due to lack of financial resources and inability to combine on the part of the growers or canners.

Measures which have been taken to improve the demand for Malayan Pineapples.

It is convenient at this point to refer to the work done by the Malayan Information Agency and the Empire Marketing Board with a view to popularising Malayan Pineapples by means of systematic displays at various trade and other exhibitions. The work commenced during the year 1928 when the Empire Marketing Board suggested to the Malayan Government participation in the Colonial Fruit Show in that year with a view to advertising Malayan Pineapples. The suggestion was accepted by the Malayan Governments and a very successful display was made. Thereafter the Malayan Information Agency commenced a systematic campaign with the object both of popularising the fruit by means of displays at exhibitions and also of showing new uses to which the fruit might be put by means of cooking demonstrations. Up to the present displays have been made at several exhibitions and as a result the demand for Malayan Pineapples has been considerably stimulated, while the reputation of the product with the trade has been decidedly enhanced, this being clearly shown by the readiness with which all important firms are now joining in and assisting the work.

Recently, the attempt has also been commenced to extend the market for the fruit to the Continent of Europe and a considerable display with this object in view was staged at the Colonial and Flemish Art Exhibition at Antwerp. The question is now under consideration of organising displays at other Continental shows particularly the Leipzig and Lyons Fairs: on the Continent, Malayan canned pineapples are at present almost unknown and there does not seem to be much doubt that a large untapped market exists there. One result of this new move is to bring into evidence once more the unsatisfactory condition in relation to marketing; as the result of the Antwerp Exhibition a demand for pineapples was created in Holland, but it was found impossible to arrange for shipment direct from Singapore to Holland on account of existing trade channels; the only possibility being to purchase pines in London for re-sale in Holland.

It seems reasonable to suppose from the effects of the only systematic effort so far made to improve the market for pineapples that similar efforts in other directions would probably be equally effective. It may here be mentioned that during the visit of Mr. Ormsby Gore to Malaya in 1928, Mr. E. M. H. Lloyd, Secretary to the Empire Marketing Board who accompanied Mr. Ormsby Gore on his tour, held a conference with canners and exporters in Singapore with a view to ascertaining whether something could be done to improve the standing of the industry. The Conference met under the Chairmanship of Mr. F. W. South, then Acting Secretary for Agriculture, and suggested that pineapples should not be exported except in cans which have embossed on them the name of the maker. Otherwise the Conference was unproductive of results.

It should further be stated that in 1926 the various canners endeavoured to form an Association to regulate the selling of the produce. The Association

continued in existence till 1928 and then came to an end. The reason for the failure of the Association appears to have been that in the first instance the canners attempted to hold produce for too high prices, and that subsequently various members of the combine, under the pressure of economic conditions, went behind the arrangement and sold produce at prices below the minimum agreed on by the combine; as a result, the combine collapsed and we are informed that at present there are no prospects of being able to revive it.

Possible means of improving the conditions of the Industry.

From what has been said it appears that the main causes for the present condition of the pineapple industry are—

- (1) instability owing to the fact that cultivation has always been carried on as a catch crop, and as such has no permanent basis;
- (2) insufficient financial resources of both growers and canners;
- (3) inability on the part of the growers and of the canners to control stocks and sales;
- (4) lack of uniformity in packing and grading which has tended to give the produce a bad name;
- (5) lack of organisation in marketing which has led to pineapples being sold through a number of different channels and hence to destructive competition;
- (6) lack of incentive to maintain an adequate standard for produce and lack of means of tracing shipments back to the factories whence they originated;
- (7) speculative forward selling combined on occasions with short deliveries;
- (8) general lack of confidence in the industry.

The matter may perhaps be summed up by saying that the industry suffers from lack of funds, lack of organisation, and lack of confidence. Consequently, any step calculated to inspire greater confidence may be regarded as likely to bring about some improvement.

It seems not improbable that the existing conditions, comprising a very low price, an increasing demand, low stocks and a tendency for supplies to shorten may at some time in the near future bring about a very rapid firming up of the market. If and when this occurs it seems probable that the immediate results will be—

- (a) a further impetus to speculative buying;
- (b) a sharp move towards further planting;
- (c) a deterioration of quality.

The last event will probably be brought about by growers endeavouring to dispose of large quantities of immature fruits in order to take immediate advantage of the rise in price, while packers, in the absence of any scheme of control of quality, will also try to take advantage of the rise by forcing on to the market increased quantities of badly graded fruits; the result of this will probably be that

conditions will become more precarious than ever and confidence will be further shaken.

One might be tempted to urge that the direct remedies for the existing situation should follow those which have been successfully adopted in not dissimilar conditions in other places *viz.* the organisation of both growers and canners on a co-operative basis for buying and selling, the elimination of middlemen and direct sales to one or two selected distributing agents in the United Kingdom combined with some form of inspection and grading of produce which will afford the necessary guarantee of quality. These are the methods which are understood to have been employed with outstanding success, for example in the Californian fruit market where formerly production was in a condition somewhat resembling that prevailing in Malaya and where during the past 20 years, as the result of systematised work done on co-operative lines, the position of growers and packers has been very greatly strengthened and the industry placed on a firm basis.

Unfortunately, the adoption of these methods does not appear to be feasible at present among the bulk of the producers in Malaya. Many of the individuals concerned have numerous other interests the interlocking of which precludes combination, while the view is also held that the personnel of the industry, owing to its racial admixture, is unsuited to combination. We cannot help feeling that the chief hope for the future of the industry in all probability lies in the development of large scale undertakings with modernised factories which will grow a proportion of their pines and will also purchase produce from small growers on a fair basis.

It seems possible that the taking over of two of the best factories in Johore by an English firm may perhaps be the prelude to developments in this direction, but it is as yet too early to express an opinion on this point. At the present moment, many of the canneries are not satisfactory economic units, and they are so weak financially that they are very largely dependent upon exporters; without the financial support of the latter the industry would collapse as it is unable to obtain funds from any other source. Moreover, it is doubtful whether any individual factory is strong enough to keep the important retail distributors in the United Kingdom of the chain store type supplied with stocks of fruit which can be relied on for regularity in delivery and uniformity of quality. Consequently, the United Kingdom distributors find that the only way they can handle Malayan pineapples is to depend on Singapore shippers who are provided with their supplies by various factories. If it were possible for the canners to form a selling combine on the lines established in Hawaii, which fixes a price each season according to the demand and of which each member is free to ship under his own factory label, it might provide a solution of the case, but unfortunately there is little doubt that under present conditions such a scheme has small prospects of success.

Two of the gentlemen who gave evidence before us orally, strongly held the view that in order to improve the market for the produce it was necessary that

legislation should be enacted requiring that all pineapple products exported from Malaya should either be labelled with the name of the factory which produced it, or alternatively, that the lid of the tin should be embossed therewith.

It was pointed out by them that Malayan Pineapples are being sold in England under a large number of labels practically none of which bear any reference to the factories in which they are produced, and that this militates against the produce of any particular factory becoming known for its quality and is a bar to attempts to improve the produce by individual concerns.

One witness stated that he had for some time past been attempting to introduce his own mark on to the English market, but so far had obtained practically no success, the only place where his produce marked in this way had obtained a market was in China. He believed that if compulsory labelling or stamping was required it would put an end to the existing state of affairs whereby Malayan Pineapples were sold as a trade article in bulk, would substitute for it a condition whereby the produce of the individual factories would be sold on their own marks, and so would put an end to the existing speculative element.

At first sight the proposal seems attractive, but there are a number of points which militate against it. The first is that, as previously pointed out, it is doubtful whether any one factory could guarantee supplies of pineapples of sufficient quality and quantity to meet the demands of the largest retailing firms in England. The second and even more important, is that such a course will necessarily involve the elimination of a large number of brands which have already become known on the English market and their replacement by a smaller number of quite unknown brands. Such a process may be expected to be resisted vigorously by wholesale dealers in England who, it may be pointed out, have been responsible for building up the trade and by shippers in Malaya who are the only people at present who finance it. Between them they have popularised their own marks and at present hold the bulk of the trade in their own hands. The proposal, in fact, involves breaking down a trade that has become established along certain lines and replacing it on a different basis in the face of considerable opposition from financially powerful business organisations with established connections which, it should be observed, embrace not merely pineapples but a large range of other description of canned goods and other food products.

In the present disorganised state of the local industry there is no hope that it could surmount successfully difficulties of this description. The inability of the industry to form successfully a selling combine on the very simple lines previously attempted is, in our view, a clear index of its inability to face the much more difficult situation which legislation of the type proposed would create. It is also certain that any formal proposal for such legislation would be vigorously resisted by the Malayan exporters and by the English importers and wholesalers. Finally it may be pointed out, actual instances have occurred in the past where certain canners have acquired some reputation in the London market and have subsequently taken advantage of their brands being established in this way to ship grades far below market quality. In the circumstances it seems to us

by no means improbable that if the Government acceded to this suggestion and enacted legislation on the lines desired, the next thing would be an urgent request for its repeal emanating from the very sources which had proposed it.

We do not wish it to be inferred that the building up of a trade based on canners' marks and labels on the lines of the Hawaiian system is an undesirable end in itself, but the weakness of the industry itself, in our view, renders such method incapable of achievement at present. If the industry could attain a satisfactory standard of organisation with adequate financial backing and with properly controlled sales-distributing agencies in England, there seems to be no reason why, in due course, a trade on these lines should not evolve itself, but before this can happen greater stability must be sought by other less drastic methods.

A further point which affects the situation is that practically all the factories are either owned by Chinese or operated under Chinese names. Rightly or wrongly, at the present time there is a decided popular prejudice against Chinese food in the United Kingdom; it may be misplaced, but it is a factor which must be allowed for; further, the Malayan pineapple industry has hitherto been systematically advertised as Empire produce in connection with the propaganda of the Empire Marketing Board; it might be very difficult to reconcile, in the eyes of the British consumer, the advertisement of goods bearing a characteristic Chinese name with their continued inclusion in a scheme for pushing sales of Empire produce. For all these reasons we consider that legislation on the lines advocated by the two witnesses is inexpedient.

There is, however, another aspect of the case which, in our opinion, merits more favourable consideration. At the present time most of the produce comes forward in packages which bear no mark enabling them to be traced to their origin after they have left Malaya. This seems to be a distinct source of weakness inasmuch as the fact that tins cannot be traced after they have left the country is a direct incentive to careless work in grading and packing. We therefore consider that legislation is desirable requiring that each case and tin before it leaves the factory should be stamped or embossed with an identifying mark which would be registered by Government and would be known to shippers and wholesale buyers, but would be of such a nature as to disclose nothing to the retailer and the consumer.

This would in part meet the wishes of the producers as expressed above; it would be free from the objection which we have previously set out, and provided no opposition is offered to it by wholesalers in England, seems to us to be a reasonable and desirable provision.

We have already alluded to the dangers which exist in relation to the lack of standardisation and the probability of a fall of quality following on a rise in price. We think that a case may exist here in which Government assistance might be forthcoming by the introduction of systematic Government grading and inspection of produce before it leaves the factory and the enactment of legislation requiring that such grading should be done. Government produce

inspection schemes have been successfully introduced in West, East and South Africa in the case of various industries and have brought considerable benefit in their train. There appears to be good reason to believe that if the establishment of some form of Government grading could be effected a marked step towards the stabilisation of the pineapple industry would be achieved. There does not appear to be any insuperable obstacle in the way of the establishment of such a system of grading and it would certainly have, according to the evidence that has been presented to us, a very appreciable stabilising effect on the market. Those representatives of the canners and exporters whom we have consulted stated that such a scheme would be welcome, while there does not appear to be any ground for supposing that it would be opposed by buying interests at Home; on the latter point the Chairman has recently caused enquiries to be made through the Malayan Information Agency in England, and information has been received that such a proposal would be strongly supported by English firms.

It is estimated that such a scheme could be financed by a small export cess on canned pineapples; to give an idea of the probable amount, we may point out that in Australia the cess charged for a similar service is 1d per case. We recommend that the question should be fully investigated with a view to working out a scheme for the imposition of such a cess and the organisation of a system of inspection, and that if and when a satisfactory scheme has been worked out the necessary legislation should be imposed to bring it into force. The necessary legislation could probably be combined with the recommendation in the preceeding paragraph to make an enactment, which would be enacted in each of the territories concerned.

It is considered that probably the most satisfactory method of inaugurating such a system would be to make it voluntary during the initial stages—say during the first twelve months. Such a course would have the advantages—

- (a) That it would materially facilitate the organisation of the grading service since all who adhered to it voluntarily may be expected to assist the grader to the utmost of their power, and this would greatly ease the overcoming of the inevitable initial difficulties.
- (b) It would afford a demonstration of the advantages following such a course and so would facilitate the adoption of the measure by all concerned when it is considered expedient to render it compulsory on all.

In relation to the organisation of growers on co-operative lines, the difficulties foreseen have been indicated. We think, however, in spite of these, some efforts might be made further to explore possibilities in this direction. We are informed that a Chinese Agricultural Inspector for Singapore has recently been appointed and we suggest that among the activities of this officer should be comprised an enquiry as to the possibility of bringing about some measure of co-operation amongst growers.

We have already pointed out that conditions for the cultivation of pineapples are probably more favourable in Malaya than in most other places and that considerable tracts of potential pineapple land still exist. It seems reasonable, in view of what has been said, to suppose that an opening exists for the further extension of the industry and also for the development of a higher class trade in pineapples once a measure of rationalisation and confidence can be imparted to the industry. There is probably a considerable market for a better class of article than is at present produced in Malaya and if a reasonable standard of production is assured with a reasonable financial stability, consumption can further be extended.

It has been suggested that before attempts are made to develop pineapple growing as a main industry it is necessary to await the results of the experiments on the manuring and cultivation of pineapples in order to ascertain whether it would be an economical proposition to grow pines as a main crop, and that until this information is forthcoming it might be unwise to take active steps to attempt to develop an industry on a main crop basis.

We think that this view may be ultra cautious and conservative. There is no doubt that experimental work on these points is desirable; there is, however, also no doubt that natural conditions on suitable lands in Malaya are more favourable to pineapple growing than is the case in the majority of countries, that the experience obtained in other countries is available as a guide, and that in other places developments are beginning without any such preliminary investigations. We have already alluded to the initiative being taken in Mauritius and Kenya, and we would here also like to point out that a report very recently received from the Empire Marketing Board indicates that the Japanese Government is making very considerable efforts to foster the development of the pineapple industry in Formosa, and that a beginning has already been made with what appears to be a serious attempt under Government assistance and advice to capture a part of the English market. In connection with the industry, the Japanese Government has already established nurseries for the raising and distribution of plants, introduced a system of compulsory inspection and grading of produce, and given considerable money grants for the purpose of subsidising the creation of modern factories.

Malaya is better situated than Hawaii, Formosa, Mauritius or East Africa, from the point of view of both climate and labour supply to retain and to extend the pineapple industry, and we think it would be unfortunate if it failed to retain the trade which it has built up if this can be avoided by timely measures of assistance similar to those which are forthcoming to aid developments elsewhere.

We therefore think that Malayan Governments would be well advised to examine the possibilities of fostering and assisting developments by alienating land suitable for pineapple cultivation on favourable terms, e.g. comparable with those adopted for oil palms, provided that adequate guarantees are forthcoming both as to cultivation and also manufacture in order that the obvious advantages

which Malaya presents in this direction should not be overlooked in favour of other countries. This suggestion has been strongly endorsed by the Malayan Information Agency.

We suggest that the desirability of providing facilities for assisting companies or undertakings that are desirous of establishing pineapple cultivation and canning on a sound basis might be considered. Government assistance to agricultural undertakings in the Federated Malay States is by no means a new idea; in this connection we may draw attention to the work of the Planters Loans Board during the past 17 years; elsewhere the principle has been adopted on a considerable scale in relation to other industries, notably in relation to erection of sugar factories in South Africa and in the West Indies, while recently the Mauritius Government has subsidised an experimental pineapple factory in that Island. We do not wish it to be inferred that we desire to advocate advances except where fully adequate guarantees are forthcoming and there appears to be—on expert investigation—satisfactory prospects of success.

In conclusion, we desire to emphasise once more that a trade of very considerable value has been built up in Malaya in canned pineapples, that the circumstances in which this trade has become evolved have tended to cause it to be regarded as an ephemeral thing with no great stability; that this view is almost certainly wrong and that the present condition of affairs is merely the outcome of the thoroughly unsound conditions on which the industry has been evolved and is maintained. It seems to us clear that if under these admittedly unsatisfactory conditions an industry of considerable value can become evolved, given rationalisation and a sound financial basis, it is capable of becoming an asset of great permanent value to Malaya at a time when additional resources are most urgently required.

Reviews.

Weekly Canned Fruit Notes.

Empire Marketing Board. Printed and published by His Majesty's Stationery Office.

This new weekly publication made its first appearance on 21st May, 1931. The Empire Marketing Board states "that the 'Notes' are to a certain extent experimental, but it is hoped to develop the service in course of time, particularly in regard to information as to shipments afloat of canned fruits and by the inclusion of information on canned vegetables and dried tree fruits."

The first three numbers of this publication have just arrived. They contain information regarding shipments and arrivals of canned fruit into the United Kingdom and various notes on recent developments and trade prospects which should be of very great value to pineapple packers and exporters in Malaya.

Interesting figures of the production of canned fruits in the United Kingdom are contained in the first number. In view of the possible effect of this industry on the future demand for Malayan canned pineapples, our local trade will doubtless wish to keep in close touch with developments in this direction.*

Information is also given concerning the production of citric acid from pineapple waste in Hawaii. It is stated that the cost of the plant is about £46,000 and it is expected to produce 3,000 lbs. of citric acid per day.

No mention is made of the cost of this publication. The Director of Agriculture is prepared to forward to the Empire Marketing Board a list of those who desire to receive future issues of *Weekly Canned Fruit Notes*.

D. H. G.

The Malayan Information Agency in 1930†

In this concise Annual Report evidence will be found of the continued usefulness of the Agency and it will be realised that a large part of its work, especially on the publicity side, has been concerned with agriculture.

In addition to the six month's exhibition at Antwerp, the Agency participated in nine other exhibitions. The main feature of the exhibits was Malayan canned pineapples and the increasing popularity of this product on the home market has undoubtedly been due in part to the activities of the Agency.

The many displays staged by the Agency at exhibitions, the wide use made of modern means of advertising such as the cinema, the increasing number of

* In this connection the Malayan pineapple trade should obtain *The Manchester Guardian and Commercial* of May, 1931, which contains a special supplement of 12 pages on the British Canning Industry, price threepence plus postage, obtainable from the publishers.

† Report on the administration of the Malayan Information Agency for the year 1930. F.M.S. Federal Council Paper No. 19 of 1931.

contributions sent to the Press and the distribution of the attractive and informative literature of the Agency are factors which, doubtless, have contributed to the very satisfactory increase in the number of enquiries received during the year, which is the measure of the appreciation of the public of the facilities offered by the Malayan Information Agency.

D. H. G.

Fruits and Fruit Culture in the Dutch East Indies.

By J. J. Ochse. 180 p.p. 57 coloured plates, bibliography and index.

G. Kolff Co. Batavia. 1931. Price guilders 17.50.

The publication in English of an illustrated survey of the more important fruits cultivated in the Dutch East Indies contributes a valuable addition to knowledge of local fruit production. With its diversity of soils and climatic conditions and large population the Dutch East Indies devote a considerable amount of attention to fruit culture. This important branch of horticultural science is controlled by the Horticultural Service of the Department of Agricultural, Industry and Commerce, at Buitenzorg, of which Service Mr. Ochse is Chief.

The book under review deals with some fifty fruits including recognised varieties of the banana, mango, pineapple and orange. The introduction contains a useful summary of what has been accomplished by the Department of Agriculture in assisting the fruit industry in Java. The fruits are treated in alphabetical sequence of their Natural Orders; by this means related species are grouped together and may be readily compared. The vernacular names used throughout the East are recorded together with reference to those names employed in Java and the Outer Provinces. A complete botanical description of each species is appended; the habit of the trees, foliage, flowers and fruit being described in detail. This is supplemented with information regarding the cultivation, uses, and observations on the individual fruits. Notes on the incidence of diseases and pests are given in the case of certain fruits. A notable feature is the excellent coloured plates of the fruits, flowers and foliage of each species described. The illustrations are faithfully reproduced in colour from drawings from nature and convey a true impression of each fruit.

The book is of considerable value to those engaged in the study of tropical fruits on account of the accurate nomenclature employed for the individual species. The results of practical experience with asexual propagation, particularly the use of seedling trees as stocks for budding desirable forms, will serve as a useful guide to the improvement of many local fruits in Malaya.

J. N. M.

Horticultural Abstracts.

Issued by the Imperial Bureau of Fruit Production, East Malling, Kent, England.

Quarterly. Price 1s. 6d. per number or 5s. per annum post free.

This quarterly abstract Journal has arisen in response to the express desire of horticulturists from all parts of the Empire, culminating in the resolution adopted at the First Imperial Horticultural Conference held in London, August 1930.

Its aim is to collect under one cover summaries of the more important current horticultural literature, special emphasis being attached to fruit production, storage and allied subjects.

The first number of this publication is dated March 1931 and contains 109 abstracts. The ever-increasing number of publications renders a journal such as this of considerable value.

Recent Reports.

ANNUAL REPORT OF THE DEPARTMENT OF AGRICULTURE S.S. AND F.M.S. FOR THE YEAR 1930. By H. A. Tempany, Director of Agriculture. 31pp. Kuala Lumpur, F.M.S. Government Press, 1931. This Malayan report is divided into two parts, the first dealing with Agriculture in Malaya, while the second part treats of the work of the Department of Agriculture for the year under review with summaries of the activities of each Division. A Staff List is included as an Appendix to the Report.

The Report forms a concise review of agricultural conditions during 1930 and of the scope and progress of the work of the Department during that period. Its method of presentation renders it more easily used as a document of reference than its predecessors.

CO-OPERATION IN MALAYA. The Report on the Co-operative movement in Malaya for the year July 1st 1929 to June 30, 1930 is contained in two separate reports, one dealing with the co-operative movement in the Straits Settlements and the second on the working of the co-operative societies in the Federated Malay States.

The progress of the movement in the F.M.S. is shewn by the fact that the number of societies is now 158, an increase of 20 during the year with a total membership of 28,303. These societies have a paid-up share capital of \$2,726,339 and a total working capital of \$2,938,241, the increase in the total working capital during the year being \$447,949.

The general economic condition of the country has rendered progress of Rural Credit Societies particularly difficult. Nine societies were struck from the register during the year and no new societies were formed. Thrift and Loan Societies shew a slight decline in membership but an increase in working capital. The progress of the Indian Estate Labourers' Co-operative Credit Societies is more encouraging reading. The general reduction of labour forces

on estates, however, resulted in a many members returning to India with their savings.

One Co-operative Rubber Factory was started at the end of the year under review and progress was made towards organising the small-holders at three other centres.

The Co-operative Department continued to carry out a considerable programme of propaganda with the object of instilling a better appreciation of the benefits of co-operation amongst small-holders.

The Co-operative work in the Colony is mainly concerned with Salary-earners' Societies, Rural Credit Societies and Indian Estate Labourers' Co-operative Credit Societies. The total number of societies at the end of the year was 42, an increase of 8 over the previous year, with a membership of 9,376 and a total paid-up capital of \$567,473, an increase of \$167,654. The greatest progress has been made in Salary-earners' Societies.

The reader gathers from these reports that the year has been a most difficult one for the co-operative movement. The Acting Director of Co-operation, who signs these reports, observes that "Co-operation is, however, more often than not the child of necessity, and the effect of lower prices is to increase the need for combination amongst small-holders" from which he thinks it possible that the small-holders "who paid little attention during the years of prosperity may be willing to give a readier ear to co-operative propaganda when times are hard."

THE IMPERIAL COLLEGE OF TROPICAL AGRICULTURE. PRINCIPAL'S REPORT FOR THE YEAR 1929—30. This is a record of the activities of the College which is concerned with courses of study of both a general and a special nature, besides research work connected with tropical crops.

The Principal (Mr. Geoffrey Evans, C.I.E.) states 'hat the number of students taking the Diploma course is less than in the previous year. The smallness of the classes makes the cost of training correspondingly high, as the same staff has to be maintained and the same course of lectures delivered whether the classes consist of two men or twenty. The widespread depression in agricultural industry is resulting in the young men seeking openings in other professions, but it is hoped that with an improvement in the values of agricultural products, a renewed interest will arise in agricultural training and particularly in the facilities offered by this excellently designed course.

The research work at the College has been consolidated rather than extended. The long range research is confined to four main crop, namely, sugar-cane, cacao, bananas and citrus. The last two are of particular interest to Malaya and some account has already been given in these pages to the very valuable research work on bananas*. The report shews how closely the various

* Review of "The Behavior and Diseases of Banana in Storage and Transport" *Malayan Agricultural Journal*. Vol. XIX No. 5, May 1931,

scientific departments of the College are working with the object of solving some of the main problems that beset tropical agriculturists.

The report points briefly to the lines of investigation, includes an imposing list of scientific papers published during the year, besides giving some account of the sugar factory and information on the general administration of the College. Under "General" are paragraphs concerning the work of special committees, some of which are of an advisory nature while others co-ordinate investigations on particular problems.

It is sometimes difficult for a new institution to find its exact place in the existing order of things. The Imperial College was started eight years ago in particular to satisfy the need of post-graduate training in tropical agriculture. The College has not only attained this object, but has managed to make considerable advances in scientific research and its economic application without over-lapping with the research work in progress at Departments of Agriculture in other tropical countries.

REPORT AND PROCEEDINGS OF THE SECOND INTER-DEPARTMENT AGRICULTURAL CONFERENCE. *Special Bulletin General Series No. 5 of the Department of Agriculture, S.S. & F.M.S. pp. 79. Price one dollar (Straits Currency).* A number of the papers read at this Conference, which was held at Kuala Lumpur at the end of October 1930, have since been published in the *The Malayan Agricultural Journal*. This new bulletin therefore presents a statement of the facts advanced by the introducer of each subject followed by a fairly full report of each ensuing discussion. It contains a most useful record of the resolutions adopted and of the views of a number of agricultural officers on a diversity of subjects. The subsequent work of giving practical effect to such resolutions will doubtless be much assisted by this Report.

D. H. G.

Departmental.

FROM THE DISTRICTS.

The Weather.

Generally speaking, the rainfall for the month on the West Coast and inland areas of Perak, Selangor and Negri Sembilan has been below normal for August. In Malacca, on the contrary, figures indicate that the heavy August rainfall usual for this area took place. It is interesting to record that the Malacca total figures of rainfall for the five months April to August were nearly double those for the same period of an average year.

Remarks on Crops.

Rubber.—The prices obtained by the small holder for his rubber have ruled appreciably lower during the month. The very great range in price persists, but the higher figures given in the following quotations are confined to special areas or to a quality of the produce well above the average. Quotations per pikul are, Smoked Sheet, \$5 to \$12; Unsmoked Sheet, \$5 to \$11; Scrap, \$1.50 to \$5.

Figures of first measurements made in connection with bark consumption investigation on small holdings have been received from a number of localities for record in the office at headquarters. Arrangements have been made for selecting and marking of holdings in Johore at an early date. Unfortunately up to the present it has not been possible to include Kedah in these investigations.

The further decline in price of rubber has resulted in an increase of untapped holdings in areas where owners possess padi lands as well, but where the owner relies almost entirely upon rubber for his livelihood the result has been a tendency to heavier and less careful tapping.

From all parts of the country reports have been received drawing attention to the increasing difficulty of maintaining the former standard of control for mouldy rot disease owing to the inability of many small holders to purchase the fungicides necessary for treatment and the impossibility, under present circumstances, of insisting upon a period of cessation of tapping during treatment. Consequently, where former standards of control have been proved impossible of attainment, efforts have been directed towards minimising the damage done to trees by the disease by periodic painting with an approved fungicide.

Padi.—In Province Wellesley cultural operations have been delayed on account of dry weather and consequent insufficiency of water in the fields. From the same cause the sowing of nursery beds has been delayed whilst, in the Dindings, a number of nurseries have failed. The dry weather extended to Krian, but here irrigation water has been adequate for requirements. In Bagan Serai mukim planting is nearing completion being, as usual, somewhat ahead of the rest of the district, although planting has commenced in all other mukims save that of Selinsing. Floods are delaying operations in Central districts of

Malacca and the coast mukims of Jasin district. The floods experienced in Malacca early in the month subsided rapidly and did little damage except in certain mukims of Alor Gajah and Jasin districts where some padi was destroyed. Transplanting is being done by plants obtained by division of the padi in undamaged blocks. Apart from the above noted incidents the crop generally shows good promise throughout the country.

Tobacco.—Interest in this crop is maintained in the Baling District of Kedah and in Province Wellesley, whilst the area continues to extend in Perak South and enquiries regarding the crop have been received from Johore. Some planting has also taken place in the Kuala Kangsar District of Perak.

It is reported from Kedah that although plants are well grown, curing methods are poor. The Rangoon type is not proving a success in Province Wellesley owing to early flowering and consequent low production of leaf. On the other hand the leaf is large and of good quality. The Jaffna type raised from seed supplied by the Department is proving one of the most successful in this Settlement for local requirements. During the month some 58 pikuls (3½ tons) of Province Wellesley grown and cured leaf was sold in Penang.

Present prices per pikul reported from Province Wellesley range from \$40 to \$43 for first quality and \$25 to \$30 for second quality. In Kedah, prices for dried but uncured leaf per pikul range between \$12 and \$20. It is reported from Kuala Kangsar that whole dried plants are being sold to local shops for from \$40 to \$60 per pikul.

Agricultural Stations and Padi Test Plots

Kedah.—Nurseries were sown at the Telok Chengai Rice Station and at the four Padi Test Plots.

At the Agricultural Station of Gajah Mati clearing and burning of jungle was in progress.

Province Wellesley.—*Glugor Test Plot*. The inter-season crop having failed, plants have been removed from the area and the land prepared for the main crop. Early sown varieties received their first transplantation and the shorter season varieties were sown. Planting is being delayed as long as possible to coincide with the time of this operation on surrounding lands.

Bukit Merah Padi Station.—The land at the end of the month was ready for planting the earliest sown varieties whilst the shorter season varieties were sown. The new irrigation channel is proving an asset to the Station as well as to cultivators of surrounding lands.

Perak.—(a) *Agricultural Stations*. *Selama*. Dry weather, causing the land to bake, has somewhat retarded the work of "lalang" grass eradication and preliminary cultivation of the land.

Kuala Kangsar.—Some crops, notably maize and tobacco, show uneven growth due apparently to uneven fertility of the soil. Virginia varieties of tobacco have made poor growth, but a locally obtained Chinese variety promises to prove more satisfactory. A fairly heavy crop of rambutans was produced

on selected trees and the seed has been sown to provide plants for sale and for stocks for future budding. Poultry selected for the purpose were despatched to the Bukit Fraser Station, thus providing the space required for increasing the stock of Rhode Island Red and for experiments with local fowls and cross breeds.

(b) *Padi Stations and Test Plots. Talang.* Preparation of land on the area set aside for manurial experiments has been in progress. An area for the comparative cultivation experiments has been demarcated and marked off into $\frac{1}{4}$ acre blocks. An area for banana manurial experiments has been chosen and the land is being tilled and marked off in accordance with an approved scheme.

Kamunting Slimed Area.—Final cultivation in readiness for planting next month is nearly complete.

Selinsing Cultivation and Manurial Trials.—Seedlings are in good condition and cultivation is completed, but planting is being delayed to fall in line with neighbouring lands where operations are less forward.

Bukit Gantang.—Dams have been repaired and clearing operations are in progress. Nurseries are in good condition.

Lenggong.—The long maturation Seraup padi strains were planted and the land prepared to receive the shorter season Radin varieties.

Bruas.—A rectangular block of 5 acres has been bunded off to form this new Test Plot in a manner to allow of a convenient lay-out for varietal trials on approved experimental lines. Seraup strains have been planted.

Selangor.—Cheras Agricultural Station. Plans for buildings and their sites have been approved by the Director. Progress on clearing the higher land has been made.

Kuang Padi Test Plot.—Plants are making satisfactory growth but stem borer infection is fairly heavy. Erection of the Agricultural Subordinate's quarters has been commenced.

Kajang Padi Test Plot.—A weeding was given. Water is somewhat scarce.

Negri Sembilan.—Rembau Agricultural Station. Work has started on the buildings. Preliminary cultivation is completed and seeds of cover crops have been obtained in readiness for sowing.

Rembau Test Plot.—Planting was completed.

Malacca.—(a) Agricultural Stations. Sungei Udang. Stumping and general clearing was continued. Holing for bananas and kapok was completed and nurseries prepared for coffee, arecanuts and pepper.

Jasin.—The site has been approved for a station in this district.

(b) *Padi Station and Test Plot. Pulau Gadong Station.* Planting was completed except for the very short season varieties. *Nymphula depunctalis* occasioned some slight damage to the Milek Puteh lines but were quickly controlled by an application of tuba root extract.

Alor Gajah Plot.—Planting of the late sown varieties was completed. The plants of the earlier sown varieties are making very satisfactory growth.

DEPARTMENTAL NOTES.

Obituary.

MOHAMED TAHARIM BIN ITAM JAFFAR.

With deepest regrets, we have to record the death, at the early age of 22, of Enche Mohamed Taharim bin Itam Jaffar, who passed away at Parit Buntar, Perak on 14th August, 1931, after a very brief illness.

Enche Taharim joined the Department of Agriculture in May 1928 as a Malay Apprentice and was promoted to Agricultural Assistant on the conclusion of his course of training in April, 1931. Throughout this period, his keen intelligence and aptitude for study placed him constantly at the head of his fellow-students and he gave every promise of becoming a most capable and trustworthy officer of the Department. He possessed a happy temperament which endeared him to his instructors and to all with whom he came in contact.

Our sincerest sympathy is extended to his father, Enche Itam Jaffar bin Ngah Merah, who has served as a Sub-Inspector of Coconuts in this Department for the past 28 years.

Tours of the Director.

The Acting Director of Agriculture visited Cameron Highlands from 4th—10th August when he attended daily meetings of the Cameron Highlands Development Committee, at which His Excellency The High Commissioner, Sir Cecil Clementi, G.C.M.G., was also present, from 4th to 7th.

Tea Factory at the Government Experimental Plantation, Serdang.

The new tea factory at the Government Experimental Plantation, Serdang, commenced operations during July. The factory is a permanent type of building, based on the latest Ceylon design, 60 feet long and 40 feet wide. Rolling, firing and sifting rooms are on the ground floor and a withering loft above. The machinery is driven by a 13 B.H.P. electric motor, working at 580 revolutions per minute.

The machinery so far installed comprises the following. One "Little Giant" tea roller having a capacity of 60 lbs. of withered leaf per charge. An improved tea roll-breaker fitted with beating apparatus and sieves. A 42 inch "Venetian" tea drying machine with a firing capacity of 45 to 50 lbs. of made tea per hour. An improved tea sifter, complete with three trays, 7 feet long. A single cylinder tea cutter, fitted with 3/8 inch cells. Exhaust fans are installed in the withering loft and sifting room.

The withering loft contains five series of 'tats' each complete 'tat' being 33 feet long by 7½ feet wide, with seventeen layers of hessian, providing a total withering space of 21,037 square feet, capable of holding about 1,400 lbs. of green leaf per wither.

Tea is now being manufactured and sold locally and it is intended to send representative samples to London and Colombo for valuation and report in the near future.

Retirement of the Raja Embeh bin Raja Abdul Majid and Enche Zebidin bin Datoh Sri Lela.

Raja Embeh bin Raja Abdul Majid, Malay Agricultural Assistant, Grade I, retired on pension on medical grounds on July 13th, 1931. This officer has spent over 20 years in the service of the Government, including 18 years as an officer of the Department of Agriculture. The whole of Raja Embeh's service was spent in the State of Selangor. He commenced work as a clerk in the Secretariat. His first appointment in the Department of Agriculture was to the post of Sub-Inspector of Coconuts on January 1st, 1913. He was in 1918 promoted to the departmental scheme for Malay Officers as a Junior Agricultural Assistant and was promoted to a Senior Agricultural Assistant in 1925.

Inche Zebidin bin Datoh Sri Lela, Malay Agricultural Assistant, Grade I, retired on pension on medical grounds on August 27th, 1931, after completing 22 years service in the Department of Agriculture. He commenced his career in the Department as a Sub-Inspector of Coconuts on August 8th, 1909, and was placed on the departmental scheme for Malay Officers on July 1st, 1919, being promoted to a Senior Agricultural Assistant on July 1st, 1922. He acquitted himself very creditably in all the departmental examinations which he was required to undergo and applied himself seriously to his work, so that he became a very efficient inspection officer. In 1925 he suffered from a serious illness and owing to subsequent poor health it has been increasingly difficult for him to perform his duties in the very efficient manner that he did prior to his illness.

The Chief Agricultural Field Officer visits Negri Sembilan, Malacca and Perak.

The Chief Field Officer visited Malacca on August 13th, 14th and 15th and Negri Sembilan on August 16th and 17th to inspect the work of the various Experimental Stations and to discuss administrative details with officers concerned.

He paid a short visit to Perak between August 20th and 22nd, visiting Taiping, Kuala Kangsar and Tapah. His visit was mainly connected with arrangements for future development work in connection with Agricultural Stations and Padi Test Plots in that State.

I. S. P. Conference.

The Incorporated Society of Planters held a Conference at Port Dickson on 15th and 16th August, 1931, at which the Acting Director of Agriculture (Mr. F. W. South) delivered a lecture on "Agricultural Products in Malaya" and the Plant Physiologist (Mr. W. N. C. Belgrave) a lecture on "Soil Surveys in Malaya".

Statistical. MARKET PRICES.

August, 1931.

Rubber.—The price of rubber fell steadily throughout the month, in Singapore from 8½ cents per lb. to the record low price of 7¼ cents per lb. and in London from 2½d per lb. to the new low record price of 2¼ cents per lb. The average price for the month for R.S.S. equal to London standard was 7.3 cents per lb., while the London average price was 2.4 d. per lb. as compared with 9.7 cents and 3d respectively for July.

Palm Oil.—Our Singapore correspondent reports that the London price of palm oil for C.I.F. August/September was £14.5.0.

Copra.—The Singapore market for Sundried copra had little features of interest during the month. Demand increased somewhat about the middle of the month but prices subsequently sagged. The average price of Sundried for August was \$4.21 per picul as compared with \$4.70 per picul in July. "Mixed" copra was 30 cents below the price of "Sundried" throughout the month.

Coconut Oil.—The average wholesale export price of coconut oil in Singapore for August was \$9 per picul. The market for this class of oil has been weakened by the gradual reduction in the price of copra which indicated to consumers that the price would eventually drop. On account of general trade conditions the market has been cautious and there is little likelihood of a recovery unless general market conditions improve in other directions. Copra cake averaged \$1.87 per picul for the month, the price having risen from \$1.75 to \$2.00 during the second half of the month.

Gambier.—Prices have shewn but little variation in Singapore; Block averaged \$9.56 per picul and Cube No. 1 \$17.25 per picul for the month, compared with \$10 and \$19 respectively in July.

Rice.—The average declared trade value of imports of rice during July was \$3.54 per picul, compared with \$3.67 per picul in June. The retail market price in cents per gantang of No. 2 Siam rice in July was Singapore 30, Penang 25, Malacca 27, as compared with 30, 28 and 25 respectively for June.

The padi position in Rangoon is reported to be getting firmer daily; stocks are well held and prices are advancing steadily. A rice shortage is reported in Shanghai owing to a stoppage of rice-shipments from Yangtze cities on account of floods. A definite rise in padi price took place in French Indo-China during July. Stocks in hand were short early in the month, increasing later.

There appears little fear of a rice shortage as crops have generally been good in the main rice-producing countries and the demand from the chief rice-importing countries below normal, resulting in some accumulation of stocks.

Arccanuts.—Singapore prices show a further decline over those of July. Palambang Whole averaged \$3.47 per picul against \$4.17 in July and Bila Whole \$3.44 as compared with \$3.64 for the previous month. For other grades,

the average prices were as follows :—Sliced \$4.87 to \$14.62; Split \$4.12 to \$5.69; Red Whole \$6.75 to \$7.34; Kelantan Split \$5.41 to \$5.81—all per picul, the price within each range depending upon quality.

Coffee.—Average Java Robusta prices varied from \$14.25 to \$16.70 per picul, the prices within these limits depending upon quality. These prices compare with \$17.62 to \$19.06 per picul for the previous month and indicate an unsatisfactory market. The average Singapore price for Palambang coffee was \$11.44 per picul as compared with \$12.79 for July.

Pincapples.—Very little business is passing, but production is now negligible and dealers do not press sales. Average prices per case in Singapore during August were :—1½ lb. cubes, \$3.44; 1½ lb. sliced flat, \$3.28; 1½ lb. sliced tall, \$3.39 as compared with \$3.48; \$3.35 and \$3.51 during the previous month.

Tapioca.—Market mostly dull with buyers holding off for lower prices. Singapore average prices per picul for August were :—Flake, fair, \$3.32; Pearl seed, \$4.19; Pearl, medium, \$4.42 as compared with \$3.37; \$4.43 and \$5.00 respectively for July.

Sago.—Moderate transaction are reported in a quiet but steady market. Average Singapore prices per picul during August were :—Pearl, small fair, \$4.25 as compared with \$4.39 in July; Flour, Sarawak fair, \$1.78 as compared with \$1.84 in July.

Pepper.—Prices remained steady for the greater part of the month, but with supplies coming in freely the market closed the month dull and prices tend to decline. Average Singapore prices per picul in August were :—Singapore Black, \$18.19; Singapore White \$27.25; Muntok White, \$28.37. Corresponding prices in July were :—\$19.20; \$30.80; \$31.45.

Cloves.—The market calls for no comment. Prices quoted in Singapore throughout August were :—Zanzibar \$43; Amboina \$48 as compared with average prices of \$46.60 and \$49.40 respectively for July.

Mace.—Market steady though the demand is negligible. Singapore average prices for August were as follows :—Siouw \$56.50; Amboina \$38.75 as compared with \$56.10 and \$39.30 respectively in the previous month.

Nutmegs.—Demand is small with values declining a little. During August, 110's averaged \$20.87 per picul in Singapore as compared with an average price of \$23.80 for July; 80's averaged \$27.37 per picul as compared with \$33.80 for July.

The above prices are based on London and Singapore quotations for rubber; on the Singapore Chamber of Commerce Reports published in August and on other local sources of information. Palm Oil Reports are kindly supplied by Messrs. Lewis and Peat (Singapore) Ltd.; reports on the Singapore prices for Coffee and Arecanuts by the Lianqui Trading Company of Singapore, and a report on the coconut oil market by the Ho Hong Oil Mills, Singapore.

1 picul = 133½ lbs. The dollar is fixed at two shillings and four pence,

NOTE. The Department of Agriculture will be pleased to assist planters in finding a market for agricultural products. Similar assistance is also offered by the Malayan Information Agency, 57, Charing Cross, London, S.W.1.

COCONUT AND PALM OIL PRODUCTION IN MALAYA

Net exports 1930 and first half year 1931.

PRODUCT.	YEAR 1930		JAN. 1 TO JUNE 30 1930		JAN. 1 TO JUNE 30 1931	
	Net Exports Tons	Value \$	Net Exports Tons	Value \$	Net Exports Tons	Value \$
Coconuts, fresh ...	10,478	406,921	4,963	216,552	3,803	99,726
Copra ...	102,014	15,307,511	40,094	6,928,923	41,126	4,384,022
Coconut Oil ...	9,473	2,359,357	4,992	1,334,494	4,957	869,703
Palm Oil ...	3,211	892,995	1,334	374,403	1,825	483,246
Palm Kernels ...	485	80,792	205	35,251	282	44,546

MALAYA RUBBER STATISTICS STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX, FOR THE MONTH OF JULY, 1931, IN DRY TONS.

TABLE I

459

Territory	Stocks at beginning of month 1			Production by Estates of less than 100 acres and over			Production by Estates of 100 acres and over (estimated) 2			Imports			Exports (including re-exports)			Stocks at end of month		
	Ports	Dealers	Estates of 100 acres and over	During the month	During the year 1931	during the month	during the year 1931	Foreign	Malay States	Foreign	Malay States	Foreign	Local	Foreign	Local	Dealers	Estates of 100 acres and over	Ports
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
MALAY STATES:—																		
Federated Malay States	...	...	13,679	12,723	80,206	8,056	60,065	Nil	Nil	Nil	26	12,107	7,458	90,221	49,327	14,217	14,174	...
Johore	...	...	2,301	3,769	24,619	3,881	27,231	Nil	4	Nil	16	906	6,551	5,321	47,156	2,305	3,930	...
Kedah	...	...	395	2,215	14,495	956	7,284	Nil	Nil	Nil	Nil	579	2,614	4,267	17,713	411	2,347	...
Perlis	...	...	9	6	8	52	71	Nil	Nil	Nil	Nil	Nil	13	Nil	129	11	4	...
Kelantan	...	...	208	156	170	1,210	601	3,020	5	Nil	17	56	656	486	3,747	262	166	...
Tengganu	...	...	55	50	128	708	64	354	Nil	Nil	Nil	Nil	192	Nil	1,062	55	50	...
Total Malay States	...	...	16,647	19,708	191,511	121,200	13,563	98,025	5	4	42	13,648	17,484	100,225	119,134	17,261	20,671	...
SETTLEMENTS																		
Malacca	...	...	3,025	1,389	1,382	8,401	...	Nil	Nil	Nil	...	3,923	...	31,841	...	3,209	1,448	...
Province Wellesley	...	...	133	595	549	3,130	(2)	Nil	Nil	Nil	...	...	...	...	...	130	545	...
Pindings	...	...	116	109	105	660	2,125	13,316	Nil	17,530	119,427	5,390	Nil	4,719	Nil	115	121	...
Penang	...	...	1,175	5,139	6	8	52	554	4,867	4,867	...	20,697	...	...	...	5,360	9	2,247
Singapore	...	...	4,440	33,626	298	176	1,264	9,097	58,016	58,016	...	...	...	...	...	33,835	322	5,125
Settlements	...	...	5,915	42,066	2,397	2,230	13,507	9,651	17,530	62,883	119,427	30,910	Nil	128,063	Nil	42,649	2,445	7,372
TOTAL MALAYA	...	...	5,915	58,713	22,105	21,371	134,707	9,656	17,534	62,900	119,469	43,658	17,484	302,758	119,134	59,910	23,116	7,372

TABLE II
DEALERS' STOCKS IN DRY TONS 3

Class of Rubber	Federated Malay States		Penang		S'pore		Prov-ince Penang		Johore		Total
	21	22	23	24	25	26	27	28	29	30	
DRY RUBBER	11,528	31,039	4,976	3,253	906	51,762	...	...	...	...	...
WET RUBBER	2,689	2,736	384	291	1,399	7,409	...	...	...	...	...
TOTAL	14,217	33,835	5,360	3,454	2,305	59,171	...	...	...	...	...

TABLE III
FOREIGN EXPORTS

PORTS	For month		during the year 1931
	For month	For month	
Singapore	...	30,509	199,131
Penang	...	8,267	67,887
Port Swettenham	...	4,641	32,554
Malacca	...	241	3,186
MALAYA	...	43,658	302,758

TABLE IV
THE PROPORTION OF FOREIGN EXPORTS REPRESENTING DOMESTIC PRODUCTION 4

AREA	For month	during the year 1931
Malay States ...	33,842	240639
Straits Settlements	...	...
MALAYA	...	33,842 240639

- Notes:—1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained.
 2. The production of estates of less than 100 acres is estimated from the formula: Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month. + Consumption, i.e., Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [19A] estimated—[2] - [3] - [5] - [9] - [10]. For the Straits Settlements, the figure represents purchases by dealers from local estates of less than 100 acres, reduced by 15% in terms of dry rubber.
 3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15%; wet sheet, 25%; scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
 4. The proportion of foreign exports representing Malayan domestic production is estimated by deducting the average monthly dry weight of foreign imports over a period of 2 months from the gross foreign exports of the later month, the foreign exports of the Malay State, being domestic production.
 5. The above, with certain omissions, is the Report published by J. I. Miller, M. C. S., Acting Registrar-General of Statistics S.S. and F.M.S., at Singapore on 22nd August, 1931.

Budgrafted Rubber S.S. & F.M.S.

TABLE I.

BUDGRAFTED ESTATES, BY ACREAGE AND SIZE OF HOLDING, AT END OF 1930.

TERRITORY	In areas of over 1,000 acres each		In areas of between 1,000 and 500 acres each		In areas of between 500 and 100 acres each		In areas of between 100-50 acres each		In areas of between 50-10 acres each		In areas of under 10 acres each		Total Number of Bud-grafted areas	Total Acreage of Bud-grafted areas
	No. of Areas	Total Acreage	No. of Areas	Total Acreage	No. of Areas	Total Acreage	No. of Areas	Total Acreage	No. of Areas	Total Acreage	No. of Areas	Total Acreage		
FEDERATED MALAY STATES—														
Perak	...	...	1	537	18	3,517	9	619	20	497	18	70	66	5,240
Selangor	3	10,469	7	5,573	27	6,128	16	1,072	24	607	13	50	90	23,899
N. Sembilan	4	8,228	4	3,029	26	6,525	7	575	15	342	7	22	63	18,721
Pahang	1	2,474	...	...	3	1,041	3	192	5	161	2	8	14	3,876
Total, F.M.S.	8	21,171	12	9,139	74	17,211	35	2,458	64	1,607	40	150	233	51,736
STRAITS SETTLEMENTS—														
Province Wellesley	...	...	...	...	1	262	...	...	3	85	4	24	8	371
Dindings	...	...	1	730	...	...	...	...	...	...	...	...	1	730
Malacca	1	1,366	...	...	10	2,535	2	122	3	55	5	25	21	4,103
Penang	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Singapore	...	...	...	...	...	...	...	...	1	20	1	5	2	25
Total, S.S.	1	1,366	1	730	11	2,797	2	122	7	160	10	54	32	5,229
S.S. & F.M.S.	9	22,537	13	9,869	85	20,008	37	2,580	71	1,767	50	204	265	56,965

NOTE.—For the Unfederated Malay States, the information is not at present available.

TABLE II.
BUDGRAFTED ESTATES BY YEARS BUDGRAFTED AND AREA IN TAPPING AT THE END OF 1933.
AS DECLARED BY ESTATES OF 100 ACRES AND OVER

TERRITORY	YEAR OF BUDGRAFTING										Total area Budgrafted at the end of 1930	Total area of Budgrafted Rubber in Tapping
	1922 or earlier	1923	1924	1925	1926	1927	1928	1929	1930	Acres	Acres	Acres
FEDERATED MALAY STATES—	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Perak	1,127	36	48	...	96	215	433	1,038	2,247	5,240	1,167	1,167
Selangor	1,058	519	377	232	727	1,072	2,074	7,784	10,056	23,899	2,075	2,075
N. Sembilan	...	25	120	187	...	942	4,330	6,151	6,966	18,721	127	127
Pahang	...	...	...	...	...	15	108	2,695	1,058	3,876	...	...
Total, F.M.S.	2,185	580	545	419	823	2,244	6,945	17,008	20,327	51,736	3,369	3,369
STRAITS SETTLEMENTS—												
Province Wellesley	...	...	...	..	...	...	5	45	321	371	...	...
Dindings	194	...	...	85	101	250	...	100	...	730	192	192
Malacca	...	...	57	51	92	348	689	2,056	810	4,103	...	...
Penang	...	...	...	...	...	...	...	...	...	...	...	...
Singapore	...	...	...	...	...	...	5	3	17	25	...	...
Total, S.S. ...	194	...	57	136	193	598	699	2,204	1,148	5,229	192	192
Grand Total, S.S. & F.M.S.	2,379	580	602	555	1,016	2,842	7,644	19,872	21,475	56,965	3,561	3,561

NOTE: For the Unfederated Malay States, the information is not at present available

TABLE III.

BUDGRAFTED ESTATES BY AREAS OF PROVEN AND UNPROVEN CLONES AT THE END OF 1930,
AS DECLARED BY ESTATES OF 100 ACRES AND OVER

Territory		Proven Clones		Unproven Clones, (Estates own nurseries)		Total
		Acres		Acres		Acres
FEDERATED MALAY STATES—						
Perak	...	...	3,764	1,476	5,240	
Selangor	...	...	21,923	1,976	23,899	
Negri Sembilan	...	...	17,867	854	18,721	
Pahang	...	...	3,842	34	3,876	
Total F.M.S.		...	47,396	4,340	51,736	
STRAITS SETTLEMENTS—						
Province Wellesley	...	...	366	5	371	
Dindings	...	...	300	430	730	
Malacca	...	...	3,201	902	4,103	
Penang	...	...	...	...	...	
Singapore	...	...	25	...	25	
Total S.S.		...	3,892	1,337	5,229	
Grand Total S.S. & F.M.S.		...	51,288	5,677	56,965	

Note: For the Unfederated Malay States, the information is not at present available

D. H. GRIST,

Acting Deputy Registrar-General of Statistics.

S.S. and F.M.S.

Rubber Areas Untapped for each of the months — April, May, June and July 1931 in the Federated Malay States and Straits Settlements.

(Estates of 100 Acres and over)

STATE OR TERRITORY	AREA UNTAPPED				(ACRES)				TOTAL AREA UNTAPPED*			
	Total areas of Estates which have entirely ceased tapping				Areas on Estates partly out of tapping (Pro-tem)							
	April	May	June	July	April	May	June	July	April	May	June	July
Perak	7480	5308	6290	6847	28588	27177	28329	29311	30068	32485	34619	36158
Selangor	13804	9959	10339	10741	35591	35633	37240	39264	49395	45592	47599	50005
N. Sembilan	10094	9493	12375	14035	25314	30089	29377	22902	35408	39582	41752	36937
Pahang	5996	6420	6348	6294	4561	4807	5041	4979	10557	11227	11389	11273
Total F.M.S. ...	37374	31180	35352	37917	94054	97706	100007	96456	131428	128886	135359	134373
P. Wellesley	3861	2934	2192	3085	7438	11448	7974	7551	11290	14382	10166	10636
Dindings	659	—	—	—	1186	1677	1569	1713	1845	1677	1569	1713
Malacca	3673	5026	3909	4650	17411	20764	21495	20802	21084	25790	25404	25512
Penang Island	747	642	747	747	393	165	173	170	1140	807	920	917
Singapore Island	6902	8642	8658	9576	7573	6222	5969	6033	14475	14864	14627	15609
Total S.S. ...	15842	17244	15506	18058	34001	40276	37180	36329	49843	57520	52686	54387
Total F.M.S. & S.S. ...	53216	48424	50858	55975	128055	137982	137187	132785	181272	186406	188045	188760

Rubber Areas rested due to the adoption of A.B.C. and similar systems of tapping in each of the months April — July 1931.

	April	May	June	July
F.M.S.	36598	33648	35966	36600
S.S.	13969	8023	11084	10841

* Not including areas untapped owing to the adoption of A.B.C. or similar schemes of periodic tapping.

GENERAL RICE SUMMARY *

July, 1931.

Malaya.—The net imports of rice into Malaya for July amounted to 45,985 tons, of which 48 per cent. was from Siam, 48 per cent. from Burma, 3 per cent. from French Indo-China and 1 per cent. from other countries.

The total imports of rice into Malaya for the first seven months of 1931 were 407,000 tons, net imports being 308,000 tons, or 40,000 tons less than for the corresponding period of 1930.

Stocks of padi and rice held by wholesale dealers and millers in the S.S. and F.M.S. at the end of June were :—padi 14,645 tons, rice 24,277 tons. These stocks converted to padi at 62 per cent., together with estimated stocks in Johore, on estates, and for retailers on the S.S. and F.M.S. amounted 46,196 tons of rice.

The padi reports, including reports for each of the Unfederated Malay States, indicate that work for the new season, 1931—32 is in hand in all areas.

India.—Total foreign exports of milled rice for the first half year 1931 were 1,246,000 tons, a decrease of 589,000 tons as compared with the corresponding period of 1930.

It is reported that the Burma exports of rice and rice products from January 1st to July 11th, 1931, were 2,316,261 tons being a decrease of 6.7 per cent. as compared with the figures for the corresponding period of 1930.

China.—Imports of rice into China in 1930 were 648,270 tons as compared with 644,214 tons in the previous year.

Japan.—Stocks of rice in Japan (Proper) on July 1st, 1931, were 3,666,484 tons, being an increase of 19.6 per cent. as compared with the stocks on the same date in 1930. Of these stocks, 556,265 tons were held by Government and 3,110,219 tons by private persons.

The rice supply for the 4 months to end of October 1931 will be 3,982,188 tons and the demand 2,822,440 tons, leaving a balance of 1,159,748 tons to be carried forward for the next season.

Siam.—Exports of rice from Bangkok from December 1930 to June 1931 were 732,488 tons, an increase of 36,019 tons or 5.2 per cent. as compared with the same period of the previous year and a decrease of 115,159 tons, or 13.6 per cent. as compared with the average of the same period for the past five years.

It is reported that there has been an increased demand from Singapore and Hongkong.

*The following is an abstract of the General Rice Summary for July 1931, compiled from various sources by the Registrar-General of Statistics, S.S.

Java, Madura and N.E.I.—At the end of June 1931, the area harvested amounted to 6,750,000 acres, a decrease of 93,000 acres as compared with 1930.

Imports into Java and Madura, January to June 1931 were 154,000 tons as compared with 189,000 tons in 1930, and the imports into the Outer Provinces, January to May 1931, were 144,000 tons as compared with 163,000 tons the previous year.

French Indo-China.—Exports of rice from Saigon (January 1st to July 1931) were 651,000 metric tons as compared with 777,000 metric tons in 1930.

Estimated production of rice in Cochin-China (1930—31) was 1,812,700 tons, being 15.3 per cent. less than the previous year and 16.5 per cent. below the average of the five years ending 1928—9, and the total crop (1930—31) of Indo-China 5,787,370 tons as compared with 5,896,610 tons the previous year, or a decrease of 1.9 per cent.

Ceylon.—Imports January to June 1931, inclusive, were 211,991 tons as compared with 244,226 tons in 1930.

Europe.—The quantities of rice shipped from the East were :—

- A. To Europe, period January 1st. to July 16th, 701,000 tons, an increase of 40.5 per cent. as compared with 1930.
- B. To the Levant, period January 1st. to June 16th, 23,000 tons, an increase of 76.9 per cent. as compared with 1930.
- C. To the West Indies and America, period January 1st. to June 2nd, 96,000 tons, a decrease of 11.1 per cent. as compared with 1930.

Egypt.—It is reported that there will be a deficit in the Egyptian crop this year owing to lack of water and that the crop will amount to only 10 per cent. of the normal crop which is between 200,000 and 300,000 tons of clean rice. The existing stock of Egyptian rice is estimated at 80,000 tons and it is considered that an import of about 100,000 tons will be required to make up the shortage in the crop.

Philippines.—The production of rough rice (1930—31) is estimated at 2,008,000 tons as compared with 2,188,000 tons (actual) in the previous year.

METEOROLOGICAL SUMMARY, MALAYA. JULY, 1931.

466

Locality	AIR TEMPERATURE IN DEGREES FAHRENHEIT					EARTH TEMPERATURE		RAINFALL						BRIGHT SUNSHINE				
	Means of		Absolute Extremes			At I foot	At 4 feet	Total		Most in a day	Number of days				Total	Daily Mean	Per cent	
	A.	B.	Max.	Min.	Max.						Min.	Max.	Min.	Precipitation* .01 in or more.				Precipitation .05 in or more.
	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.	hr.	%						
Railway Hill, Kuala Lumpur, Selangor	89.4	71.3	80.3	92	80.3	84.0	85.1	5.92	150.4	1.32	15	13	3	5		203.85	6.58	53
Bukit Jeram, Selangor	88.1	72.3	80.2	90	71	85	86.6	3.45	87.6	1.48	15	11	5	1		221.00	7.13	58
Sitiawan, Perak	89.1	72.3	80.7	91	70	85	84.0	5.98	151.9	1.72	15	14				210.80	6.80	
Kroh, Perak	85.2	69.7	77.5	88	66	80	81.7	8.38	212.9	2.40	15	14	2	6		188.65	6.09	
Temerloh, Pahang	89.4	72.4	80.9	92	71	85	84.9	5.83	148.1	2.17	14	9	4	11		190.20	6.14	50
Kuala Lipis, Pahang	88.3	70.3	79.3	91	68	82	83.1	12.86	326.7	2.27	20	19	19	20		170.65	5.50	45
Kuala Pahang, Pahang	86.8	73.4	80.1	89	71	83	84.4	7.29	185.2	1.63	18	14	2		1	226.45	7.30	60
Mount Faber, Singapore	87.3	76.1	81.7	92	72	78	82.2	6.94	176.3	1.47	15	12	1			184.10	5.94	49
Butterworth, Province Wellesley	87.1	73.6	80.3	90	71	83	84.7	5.28	134.1	1.42	13	11			1	215.00	6.94	
Bukit China, Malacca	84.4	76.3	80.3	86	71	81	82.2	15.69	398.5	3.26	23	20	9			194.75	6.28	51
Kluang, Johore	86.9	71.4	75.5	91	69	81	81.6	6.19	157.2	1.93	19	14	1	5		169.65	5.47	45
Bukit Lalang, Mersing, Johore	88.2	71.9	80.1	91	70	80	82.7	8.06	204.7	2.60	13	10	1			205.35	6.62	54
Alor Star, Kedah	87.3	74.2	80.7	90	72	81	86.5	4.57	116.1	1.62	17	14				210.65	6.79	55
Kota Bahru, Kelantan	89.5	73.5	81.5	92	72	84	85.5	5.01	127.4	1.21	15	11				233.30	7.53	61
Kuala Trengganu, Trengganu	89.3	72.5	80.9	92	71	83	84.1	5.31	134.9	3.59	12	10		1		234.65	7.57	61
HILL STATIONS.																		
Cameron Highlands, Rhodendron Hill, Pahang 5120 ft.	71.8	59.0	65.4	76	57	69	61	5.29	134.4	1.32	21	16				172.65	5.57	45
Cameron Highlands, Tanah Rata, Pahang 4750 ft.	72.3	55.9	64.1	76	51	70	61	4.73	120.1	1.00	21	17				164.85	5.32	43
Fraser's Hill, Pahang 4268 ft.	74.3	61.8	68.1	78	60	71	64	4.72	119.9	1.27	20	5	2	22		194.75	6.28	51

Compiled from Returns supplied by the Meteorological Branch, Malaya.

